Administration of a Cross-Connection Control Program

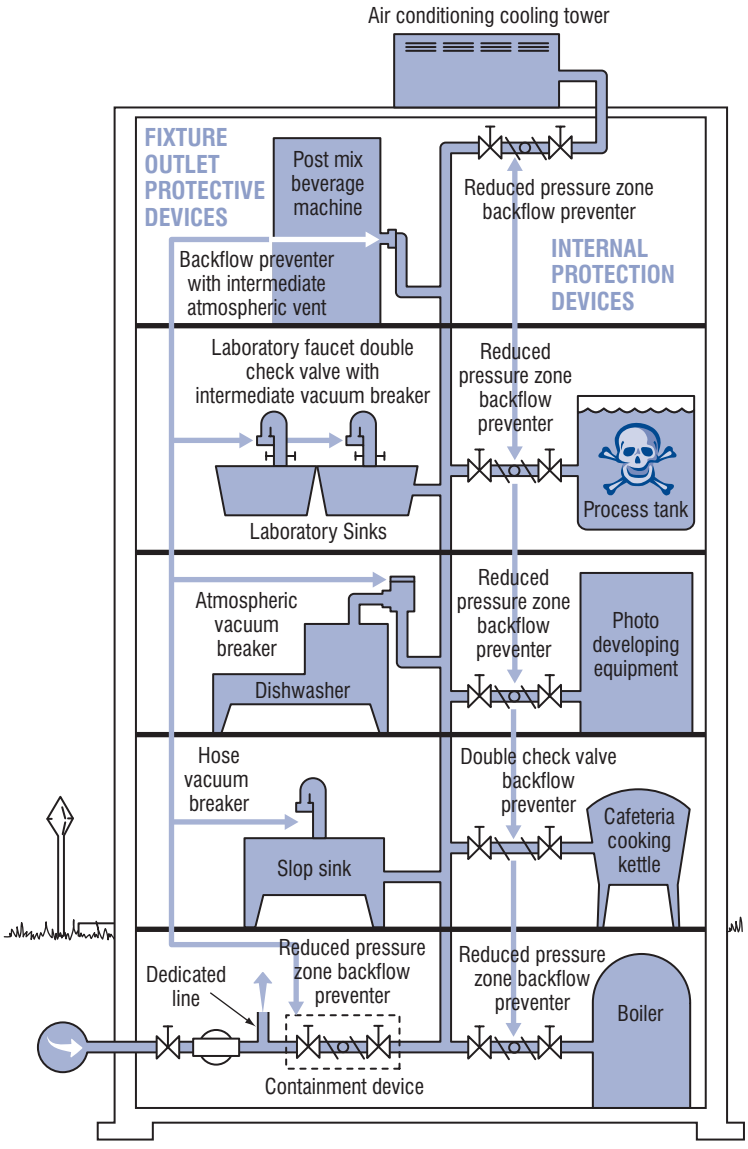
Responsibility

Under the provisions of the Safe Drinking Water Act of 1974, the Federal Government has established, through the EPA (Environmental Protection Agency), national standards of safe drinking water. The states are responsible for the enforcement of these standards as well as the supervision of public water supply systems and the sources of drinking water. The water purveyor (supplier) is held responsible for compliance to the provisions of the Safe Drinking Water Act, to include a warranty that water quality provided by his operation is in conformance with the EPA standards at the source, and is delivered to the customer without the quality being compromised as a result of its delivery through the distribution system. As specified in the Code of Federal Regulations (Volume 40, Paragraph 141.2, Section (c)) "Maximum contaminant level, means the maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of a public water system, except in the case of turbidity where the maximum permissible level is measured at the point of entry to the distribution system. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by water quality, are excluded from this definition."

Figure 43 depicts several options that are open to a water purveyor when considering cross-connection protection to commercial, industrial, and residential customers. He may elect to work initially on the "containment" theory. This approach utilizes a minimum of backflow devices and isolates the customer from the water main. It virtually insulates the customer from potentially contaminating or polluting the public water supply system. While it is recognized that "containment" does not protect the customer within his building, it does effectively remove him from possible contamination to the public water supply system. If the water purveyor elects to protect his customers on a domestic internal protective basis and/or "fixture outlet protective basis," then cross-connection control protective devices are placed at internal high hazard locations as well as at all locations where cross-connections exist at the "last free-flowing outlet." This approach entails extensive cross-connective survey work on behalf of the water superintendent as well as constant policing of the plumbing within each commercial, industrial and residential account. In large water supply systems, fixture outlet protection cross-connection control philosophy, in itself, is a virtual impossibility to achieve and police due to the quantity of systems involved, the complexity of the plumbing systems inherent in many industrial sites, and the fact that many plumbing changes are made within industrial and commercial establishments that do not require the water department to license or otherwise endorse or ratify when contemplated or completed.

In addition, internal plumbing cross-connection control survey work is generally foreign to the average water

FIGURE 43.



purveyor and is not normally a portion of his job description or duties. While it is admirable for the water purveyor to accept and perform survey work, he should be aware that he runs the risk of additional liability in an area that may be in conflict with plumbing inspectors, maintenance personnel and other public health officials.

Even where extensive "fixture outlet protection," cross-connection control programs are in effect through the efforts of an aggressive and thorough water supply cross-connection control program, the water authorities should also have an active "containment" program in order to address the many plumbing changes that are made and that are inherent within commercial and industrial establishments. In essence, fixture outlet protection becomes an extension beyond the "containment" program.

Also, in order for the supplier of water to provide maximum protection of the water distribution system, consideration should be given to requiring the owner of a premise (commercial, industrial, or residential) to provide at his own expense, adequate proof that his internal water system complies with the local or state plumbing code(s). In addition, he may be required to install, have tested, and maintain, all backflow protection devices that would be required—at his own expense!

The supplier of water should have the right of entry to determine degree of hazard and the existence of cross-connections in order to protect the potable water system. By so doing he can assess the overall nature of the facility and its potential impact on the water system (determine degree of hazard}, personally see actual cross-connections that could contaminate the water system, and take appropriate action to insure the elimination of the cross-connection or the installation of required backflow devices.

To assist the water purveyor in the total administration of a cross-connection control program requires that all public health officials, plumbing inspectors, building managers, plumbing installers, and maintenance men participate and share in the responsibility to protect the public health and safety of individuals from cross-connections and contamination or pollution of the public water supply system.

Dedicated Line

Figure 43 also depicts the use of a "dedicated" potable water line. This line initiates immediately downstream of the water meter and is "dedicated" solely for human consumption i.e., drinking fountains, safety showers, eye wash stations, etc. It is very important that this piping be color coded throughout in accordance with local plumbing regulations, flow direction arrows added, and the piping religiously policed to insure that no cross-connections to other equipment or piping are made that could compromise water quality. In the event that it is felt that policing of this line cannot be reliably maintained or enforced, the installation of a containment device on this line should be a consideration.

Method of Action

A complete cross-connection control program requires a carefully planned and executed initial action plan followed by aggressive implementation and constant follow-up. Proper staffing and education of personnel is a requirement to insure that an effective program is achieved. A recommended plan of action for a cross-connection control program should include the following characteristics:

(1) Establish a cross-connection control ordinance at the local level and have it approved by the water commissioners, town manager, etc., and insure that it is adopted by the town or private water authority as a legally enforceable document.

(2) Conduct public informative meetings that define the proposed cross-connection control program, review the local cross-connection control ordinance, and answer all questions that may arise concerning the reason for the program, why and how the survey will be conducted, and the potential impact upon the industrial, commercial and residential water customers. Have state authorities and the local press and radio attend the meeting.

(3) Place written notices of the pending cross-connection control program in the local newspaper, and have the local radio station make announcements about the program as a public service notice.

(4) Send employees who will administer the program, to a course, or courses, on backflow tester certification, backflow survey courses, backflow device repair courses, etc.

(5) Equip the water authority with backflow device test kits.

(6) Conduct meeting(s) with the local plumbing inspection people, building inspectors, and licensed plumbers in the area who will be active in the inspection, installations and repair of backflow devices. Inform them of the intent of the program and the part that they can play in the successful implementation of the program.

(7) Prior to initiating a survey of the established commercial and industrial installations, prepare a list of these establishments from existing records, then prioritize the degree of hazard that they present to the water system, i.e., plating plants, hospitals, car wash facilities, industrial metal finishing and fabrication, mortuaries, etc. These will be the initial facilities inspected for cross-connections and will be followed by less hazardous installations.

(8) Insure that any new construction plans are reviewed by the water authority to assess the degree of hazard and insure that the proper backflow preventer is installed concurrent with the potential degree of hazard that the facility presents.

(9) Establish a residential backflow protection program that will automatically insure that a residential dual check backflow device is installed automatically at every new residence.

(10) As water meters are repaired or replaced at residences, insure that a residential dual check backflow preventer is set with the new or reworked water meter. Be sure to have the owner address thermal expansion provisions.

(11) Prepare a listing of all testable backflow devices in the community and insure that they are tested by certified test personnel at the time intervals consistent with the local cross-connection control ordinance.

(12) Prepare and submit testing documentation of backflow devices to the State authority responsible for monitoring this data.

(13) Survey all commercial and industrial facilities and require appropriate backflow protection based upon the containment philosophy and/or internal protection and fixture outlet protection. Follow up to insure that the recommended devices are installed and tested on both an initial basis and a periodic basis consistent with the cross-connection control ordinance.

The surveys should be conducted by personnel experienced in commercial and industrial processes. The owners or owners representatives, should be questioned as to what the water is being used for in the facility and what hazards the operations may present to the water system (both within the facility and to the water distribution system) in the event that a backsiphonage or backpressure condition were to exist concurrent with a non-protected cross-connection. In the event that experienced survey personnel are not available within the water authority to conduct the survey, consideration should be given to having a consulting firm perform the survey on behalf of the water department.

Cross-Connection Control Survey Work

Cross-connection control survey work should only be performed by personnel knowledgeable about commercial and industrial potential cross-connections as well as general industrial uses for both potable and process water. If "containment" is the prime objective of the survey, then only sufficient time need be spent in the facility to determine the degree of hazard inherent within the facility or operation. Once this is determined, a judgment can be made by the cross-connection control inspector as to what type of backflow protective device will be needed at the potable supply entrance, or immediately downstream of the water meter. In the event that the cross-connection control program requires "total" protection to the last free flowing outlet, then the survey must be conducted in depth to visually inspect for all cross-connections within the facility and make recommendations and requirements for fixture outlet protective devices, internal protective devices, and containment devices.

It is recommended that consideration be given to the following objectives when performing a cross-connection control survey:

(1) Determine if the survey will be conducted with a pre-arranged appointment or unannounced.

(2) Upon entry, identify yourself and the purpose of the visitation and request to see the plant manager, owner, or maintenance supervisor in order to explain the purpose of the visit and why the cross-connection survey will be of benefit to him.

(3) Ask what processes are involved within the facility and for what purpose potable water is used, i.e., do the boilers have chemical additives? Are air conditioning cooling towers in use with chemical additives? Do they use water savers with chemical additives? Do they have a second source of water (raw water from wells, etc.) in addition to the potable water supply? Does the process water cross-connect with potentially hazardous chemical etching tanks, etc.?

(4) Request "as-built" engineering drawings of the potable water supply in order to trace out internal potable lines and potential areas of cross-connections.

(5) Initiate the survey by starting at the potable entrance supply (the water meter in most cases) and then proceed with the internal survey in the event that total internal protective devices and fixture outlet protective devices are desired.

(6) Survey the plant facilities with the objective of looking for cross-connections at all potable water outlets such as:

- Hose bibbs
- Slop sinks
- Wash room facilities
- Cafeteria and kitchens
- Fire protection and Siamese outlets
- Irrigation outlets
- Boiler rooms
- Mechanical room
- Laundry facilities (hospitals)
- Production floor

(7) Make a sketch of all areas requiring backflow protection devices.

(8) Review with the host what you have found and explain the findings to him. Inform him that he will receive a written report documenting the findings together with a written recommendation for corrective action. Attempt to answer all questions at this time. Review the findings with the owner or manager if time and circumstances permit.

(9) Document all findings and recommendations prior to preparing the written report. Include as many sketches or photos with the final report as possible. If the located cross connection(s) cannot be eliminated, state the generic type of backflow preventer required at each cross connection found.

(10) Consider requiring or recommending compliance of the survey findings within a definitive time frame. (if appropriate authority is in effect).